Electronic structure evolution of NaxCoO2 probed by ARPES

Prof. Hong Ding
Department of Physics,Boston College

We report systematic angle-resolved photoemission studies on NaxCoO2 single crystals for a wide range of Na concentrations. We observe a large Fermi surface centered at the G point, which satisfies Luttinger theorem. However, the small Fermi surface pockets predicted by band theory near the K points are not observed. Instead, “sinking islands” with the binding energy of 100 – 200 meV are observed. In addition, at x = 1/3 where superconductivity occurs with proper water intercalation, we found that the large Fermi surface coincides with the new zone boundary of a commensurate charge ordering, suggesting that the charge fluctuations may play an important role in the superconductivity of this material.